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From Mrs. M. C. Gord

"PHYSIOLOGICAL CRUELTY."

A REPLY

TO

"PHILANTHROPOS."

BY JOHN H. CLARKE, M.D.

Reprinted from THE ZOOPHILIST.

Victoria Street Society
FOR THE PROTECTION OF ANIMALS FROM VIVISECTION
United with the
International Association
FOR THE TOTAL SUPPRESSION OF VIVISECTION,
Offices:—1, VICTORIA STREET, LONDON, S.W.

1883.

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1888.

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"PHYSIOLOGICAL CRUELTY."*

" Cruelty is intolerable, and cannot be tolerated."

—*Philanthropos*, p. 108.

" Most tolerable and not to be endured."

—*Dogberry.*

THE latest considerable effort in the defence and glorification of vivisection is of importance in several ways. In the first place, it provides us, within the compass of a single volume, with all the arguments that have been adduced in favour of the practice since it first became one of the questions of the day. Again, it is of value in that its claims on behalf of vivisection can never be exceeded: according to the author of *Physiological Cruelty*, all that has ever been discovered in physiology, all that is of any value in medicine and surgery, nay, the very existence of a " Physiological system of medicine"—whatever that may be—all these benefits, we are assured, are directly due to vivisection. Further, the book may be taken as embodying the views and sentiments on the subject of the medical profession generally; it has been warmly endorsed by the *Lancet*,† and is in complete harmony with (if, indeed, it be not an amplified and emended edition of) the Manifesto of the Association for the Advancement of Medicine by Research. But its chief value—and it is a melancholy value—lies in this, that it presents us with a portrait of its author, drawn, unconsciously, but inevitably, by himself. In the sentiments he avows, in the sophistries he condescends to use instead of honest arguments, in the base uses to which he puts his mother tongue, he betrays his own mental and spiritual characteristics. In M. de Cyon's recent article in the *Contemporary Review*, we have had just such another self-painted portrait of a Continental vivisector. "Philanthropos" has added to our gallery a portrait, somewhat more elaborate and detailed, of the modern British vivisector; and it will be seen that they are brothers. As showing the depths to which those sink who practice and defend vivisection the book will be of permanent value. In other respects—apart from the four named above—the book is valueless. It contains nothing original that is not false, and little that has not been disproved over and over again.

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* *Physiological Cruelty; or, Fact* v. *Fancy. An Inquiry into the Vivisection Question.* By PHILANTHROPOS. London: Tinsley Bros., 8, Catherine Street, Strand. 1883.

† The *Journal of Science* and *Nature* have followed the *Lancet's* example. *Nature* cannot find words of praise strong enough to

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bestow on our author, the nameless philanthrophist. "He is," according to this great scientific luminary, "clearly a man having an accurate and extensive knowledge of physiology, combined with a sound and careful judgment, remarkable literary ability, and a wise moderation of speech." . . . . "He is something more than a man of science and a logican. He is clearly a man of large and generous heart, and a lover of animals as well as a lover of men:"—from all which eulogiums our readers will be able to gather how far it is safe to trust *Nature* as a guide in these matters. The reviewer feels "entitled to suppose"—which means that he knows very well—that "Philanthropos" is a "working physiologist," that is, a vivisector. We never had any doubts about this.

The general contention of the book may be summed up in a few words. The author maintains—(1.) That we *know* nothing of the sufferings of animals, but *may be quite sure* they do not feel as acutely as we do. (2.) That the infliction of pain, however excessive, on a sentient creature, for the presumable benefit of other creatures, is not cruelty if that benefit—or presumed benefit—is proportionately great. (3.) That such infliction of excessive pain is not immoral, because there is a law of vicarious suffering in the established order of things, and we have the right to constitute ourselves administrators of this law, and to apply it to animals for our own interest. (4.) That all our present physiological knowledge and all perfections in the science and art of medicine and surgery are due to vivisection. (5.) That it is those sentimentalists who would stop this glorious work by depriving the philanthropic physiologists of their cats and dogs, *because of the pain it gives them* (the sentimentalists) *to think of the sufferings of the animals*, who are truly chargeable with physiological cruelty.

WHAT IS VIVISECTION?

After promising in his introductory chapter that "We shall insist, as we go along, upon knowing exactly what we mean and are discussing, and having a clear idea for every word used," "Philanthropos" carries us through four chapters before he undertakes to tell us what he means by the term Vivisection. This is unpardonable, for he uses it in altogether a novel way. What he does mean by it we will endeavour to set before our readers, and in doing so, we shall be able to give them a fair specimen of our author's style. But we will first say what *we* mean by the term. In its original acceptation the word Vivisection signified the cutting open of a creature possessed of sentient life—what our forefathers used to call a "living soul"—in order to observe the vital action of its internal organs. In this sense it is used at the present day; but it has also come to have a wider meaning. Formerly, physiologists were the only vivisectors; now pathologists—who study disease—and pharmacologists—who study drug-action—have adopted the methods of the physiologists, the former using animals for the purpose of "cultivating" diseases in their bodies; the latter poisoning them with drugs, and cutting them up (usually whilst alive) to see what effects are produced. In some instances the experiments on the animals do not involve actual cutting, and these in the strictly etymological sense of the term could not be called vivisections. But the great majority of these do involve the infliction of severe and protracted pain, and therefore they may be classed with vivisections. They are essentially the same in kind, and are the fruits of the same lawless, merciless spirit. In our use of the term we shall include all mutilating experiments on living animals in the cause of medical science.

The delicate susceptibilities of "Philanthropos" cannot endure the use of the term at all. Vivisection itself—provided it be called by another name—he loves, and takes infinite pains to defend and glorify; but the name of it (to quote his own choice expression) "is intolerable, and cannot be tolerated." The camel of the *thing* he swallows readily enough; but the gnat—nay, not quite so much as a gnat—of its *name* makes him strain terribly. For our part it is vivisection itself we object to; and so long as that exists we shall not be afraid to call it by its proper name. We might be inclined to accept as an alternative the phrase "Philanthropos" puts on his title-page—*Physiological Cruelty*—but that would leave out of account pathological and pharmacological cruelty. "Scientific cruelty" would cover all the ground, but vivisection is a single word, and the world knows pretty well what it means. We see no reason to change it.

But what does "Philanthropos" understand by the term Vivisection? We had always thought that the word signified, etymologically, the cutting of a *vivum*, a thing possessed of sentient life, a thing capable of being *cut to the quick*. It seems we were mistaken. If "Philanthropos" is to be trusted, it includes the cutting of *vegetables* and *parts of organisms*—*i.e.*, *dead* tissues! Hear him:—"If I am obliged to use it, it will always be in the true sense of *cutting a "living thing"* (italics his own) "whether animal or vegetable (!), sentient or insentient (!), an organism or part of an organism (!)." (P. 42.) We now understand how the discovery of Galvani, who observed the movements of the *dead* frogs (parts of organisms), came to be attributed by Dr. Lyon Playfair to vivisection. We wonder "Philanthropos" has not discovered in some ancient record that Sir Isaac Newton stuck his knife into the apple whose fall suggested to him the existence of the force of gravity, for then (as he defines the term to include *vegetables and parts of organisms*), he would have been ableto claim that grand discovery for vivisection also!

After thus "defining" (save the mark!) the term vivisection, "Philanthropos" tries to make out that the vast majority of the experiments included under it are painless. But "Philanthropos" confesses that some experiments are painful—*i.e.*, that vivisection, as we understand it, does exist. We will now quote a passage, being careful to preserve his own punctuation and his own italics.

"To begin with, it cannot be too often repeated, that *in England, animals are never 'cut up' at all, nor are they dissected alive to show the relations of their parts.*" (P. 46.)

If there is any meaning in words, if there is any such thing as logic, this sentence contains two assertions—(1) that animals are never cut up at all in England, and (2) that they are never dissected alive to show the relations of their parts. Now, let us proceed, omitting one intervening sentence, the italics this time being our own.

"*When vivisections are performed* for teaching purposes, they are done in order to show to students something necessary for them to know, but which they cannot be taught equally well otherwise; and under the present law anæsthetics must always be used at such demonstrations." (P. 46.)

We were greatly puzzled to know what to make of these two apparently contradictory sentences, until we remembered that "Philanthropos" includes the cutting of *vegetables* under the term vivisection. We then saw that though "animals are never cut up at all in England," vegetables may be. We therefore conclude that he wishes us to understand that *cabbages*, or perhaps potatoes, are the subjects of the vivisector's demonstrations. We should like to see them under the influence of an anæsthetic!

But for purposes of original research, animals are sometimes used, and anæsthetics are not always admissible. We will now quote another example of "Philanthropos'" lucidity of style and argument. The italics are ours.

"*Painful vivisections* are therefore confined to purposes of original research, and in the *few* cases where pain *must be* given, it is *generally* very slight. *One large class* consists of inoculations, which are chiefly used in studying the origin and communication of diseases.

There are a few pricks and scratches, giving about as much pain as vaccination: and if the disease expected is induced, the subject is usually killed at once, unless kept alive to try modes of treatment. . . . ."

"*Another large class* of experiments consists in trying the effects of drugs upon animals, as a guide to their use upon human patients; or, in the case of poisons, to study their antidotes and treatment. They are generally administered by injection under the skin, and the —section [observe the delicacy of "Philanthropos" here, he cannot bring himself to use the opprobrious prefix] consists only in pinching up a portion of it, and inserting the pointed nozzle of a syringe. The pain of the actual operation is merely a prick, but that which results will be more or less, according to the nature and action of the drug."

"*There remain then a number of experiments* which cannot be further classified. . . . . In most of these, anæsthetics can be used. . . . . If an experimenter did not use them for the sake of humanity, he would for his own convenience." (Pp. 47 & 48.)

The first thing that strikes us in the above is that "Philanthropos'" "few" contains *two large classes and a number!* We should like to know what he understands by "many." The next thing is that of these "painful vivisections" many are performed on animals *under anæsthetics*. But "Philanthropos" thinks (p. 9) "it is not nonsense to talk of a painful operation being performed without pain." It seems to us that the converse is also true. He does not think it nonsense to talk of an operation which involves very much pain as being painless. As an example of his first "large class," when the pain given is only equal to that of vaccination, and the subsequent suffering of no account, take the following:—

"Aug. 28, 1882.—A little bit of cotton thread was *put into the anterior chamber of the eye* of a red and white rabbit. The animal died September 12th, 1882. Lived fifteen days. All the organs were healthy, with the exception of the liver." (*Practitioner*, April, 1883, p. 263.)

"Nov. 2, 1882.—Three or four minims of the fluid containing bacilli were injected into *the abdominal cavity* of a guinea-pig, and *the right eye* was also inoculated. Tubercular iritis developed in the eye. On January 28th, 1883, eye completely tuberculous. Tuberculous sore on abdomen at seat of injection, and the neighbouring lymphatic glands greatly enlarged. Animal thin.

"February 18th, 1883.—Killed to-day. Tubercles in lungs, liver, and spleen." (*Ib.* p. 285.)

These are experiments as grotesquely hideous, as they are cruel and misleading, of the kind which the sensitive soul of "Philanthropos" compares to vaccination!

In the second "large class," in which the action of drugs is tested, the pain is a "mere prick," but that which results is "more or less, according to the nature and action of the drug." We think "Philanthropos" must be acquainted with Dr. Lauder Brunton's work on *Pharmacology and Therapeutics.* In that work is described a series of experiments instituted on various animals to test the properties of *casca*, the ordeal poison of Old Calabar. In these the injection was not always a "mere prick," and the rest of the suffering was not confined to the normal action of the poison. The drug causes vomiting and purging. Dr. Brunton wished to find out how this was:—

"The vagi [the great nerves passing from the head to the heart, lungs, and stomach] were, therefore, divided before the injection of the poison, and then we often found that vomiting or retching did not occur, or was much less violent than usual.

"The purging might be due either to increased secretion or increased peristaltic action. If it had been caused by the former, a *quantity* of the drug, *introduced into an empty loop of the intestine, isolated from the rest by two ligatures*, ought to have caused a secretion of fluid. . . . This, however, was not the case; and we therefore concluded that the purgative action was due to increased peristaltis of the bowel."

We are not told here what animals were used, but as we are told that for the next experiment a frog was used, we infer that these were performed on mammals. "Philanthropos" would evidently make no account of the cutting of the vagi—he could not bring himself to use the word vivisection about a small matter of this kind; nor even does he think it worth mentioning that sometimes the bodies of the animals are cut open in these "researches," strings tied round the intestines, and the poison injected into a loop of them. These could not be performed under anæsthetics, for then the action of the drug would be interfered with, and the "value" of the experiment destroyed; and it must be remembered that the intestines, and the membrane covering them, are the seat of the most intense pain when irritated. "Philanthropos" is not able to see this, or to take it into account. It may be added that though these experiments were performed before the year 1877, the drug has not yet been introduced into practice.

As regards the assertion that, "If an experimenter did not use [anæsthetics] for the sake of humanity, he would for his own convenience," it is difficult to believe that "Philanthropos" does not know this to be untrue. One would suppose he had never heard of curare, which destroys the power of resistance in an animal more effectually than chloroform, and much more conveniently. But so far from being an anæsthetic it leaves the intelligence and the capacity for suffering untouched, as was proved before the Royal Commission, and recognized by them, though Dr. Lauder Brunton confessed he had been using it in his experiments under the impression that it was an anæsthetic (5694, 5695).

In this way does "Philanthropos" show us what value to attach to his *truthfulness* and *straightforwardness*. So does a just Nemesis compel the advocate for vivisection to paint in the background of his character in its true colours.

VIVISECTIONIST SENTIMENT.

"The question of whether it is pleasant or painful *to think of* has absolutely no more to do with the matter than it has with surgical operations." So says "Philanthropos" (p. 2.) This remarkable sentiment recalls a passage in Dr. Lauder Brunton's article in the *Nineteenth Century* for March, 1882. Dr. Brunton is "explaining" the parable of the Good Samaritan.

> "In the old story of the Good Samaritan, the priest and the Levite who saw the unfortunate traveller lying naked, dirty, and covered with blood, upon the road, and who carefully passed by on the other side, away from the disgusting object, would no doubt regard with scorn, *as possessing a coarser nature*, the good Samaritan, who not only approached the sufferer, but, prototype of antiseptic surgery, poured oil and wine into his wounds, in spite of any sign of temporary pain which the applications might occasion. . . . .
>
> "Some there are, no doubt, whose judgment is *entirely subordinated to the feelings*, and they, *like the priest and the Levite*, will pass by on the other side, shutting their eyes to the sight of preventible human suffering, and stopping their ears against the voice of reason." (Pp. 479-481.)

This, it will be seen, is an altogether new reading of the parable. We used to think that the priest and the Levite were indolent, selfish, and unfeeling, and that the Good

Samaritan was possessed of a fine nature and a tender heart. But we were wrong. Medical science tells us, in the person of Dr. Brunton, that the Good Samaritan had a somewhat coarse nature which enabled him to disregard his feelings, whilst the more highly sensitive and refined priest and Levite were quite overcome by their inability to endure the sight of suffering! It will be observed in this rendering there is no sorrow for the sufferer, no overpowering emotion of pity and love impelling the onlooker to see nothing but the sufferer's wants. The Good Samaritan was not thinking about the injured man, he was "controlling his emotions," and "thinking only of the relief" which he could give! And now "Philanthropos"—who must be a near relation of Dr. Brunton's—tells us that "the question of whether it is pleasant or painful to think of" vivisection is not what we have to consider. Well; we should think not. Perhaps no one but "Philanthropos" and Dr. Lauder Brunton would ever have supposed that that *was* the question. In our thinking, the question is whether it is painful or pleasant *for the animal to endure.* In the eyes of "Philanthropos" the sufferings of the animals are not to be considered, but only our feelings with regard to those sufferings. So with Dr. Brunton, it is not the injured man that the Good Samaritan thinks of, but only his own feelings of disgust which he must subdue in order that he may exhibit his professional skill. According to Dr. Brunton, the Good Samaritan was self-centered and self-regarding throughout. According to "Philanthropos" Zoophilists are all self-centered and self-regarding in this controversy; and he adjures them to lay aside these feelings, and think only of—the animals? oh no!—their own selfish interests of even a lower kind!

"Philanthropos" strives to approach this question "*quietly.*" To do this, he says, is difficult, because "it involves the sacrifice on both sides of the strongest feelings involved." (P. 1.) "A lay man or woman must not be swayed by the natural love of animals, and dislike to the infliction of pain, which makes it *grievous to think* that any creature has been hurt deliberately." (P. 2.) "Philanthropos" has a singular appreciation of the feelings of Zoophilists when he can put their own sorrow for themselves at the thought of suffering beside their love for animals. But let us see what he and his fellow physiologists are prepared to sacrifice. What is their "strongest feeling" in the matter? "Philanthropos" answers —"*Abstract devotion to Science!*" (P. 1)

We confess we are strangers to this emotion, and therefore we cannot know how much it must have cost "Philanthropos" to sacrifice it. It is an acquired emotion, for it will hardly be contended that it is the common property of all. If "Philanthropos" is a fair example of the "abstract devotee of science"—and we see no reason to doubt it—we fear, in their devotion, these devout souls have sacrificed much that was infinitely more worth their retaining. Certainly we do not regard it as fair that the Zoophilist's love of animals, and devotion to principles of truth, mercy, and justice, should be set off against the physiologist's "abstract devotion to science."

VIVISECTIONIST IDEAS OF PAIN.

"PAIN" says *Philanthropos*, "(like many other words upon which much depends) is used with a good deal of ambiguity" (p. 9). In this way does "Philanthropos" murder English, and confound words and things. He undertakes to explain to us what Pain is, very much after the fashion of his explanation of Vivisection, and does his best, as with the other term, to empty it of all meaning. He says "it is not nonsense to talk of a painful operation being performed without pain." We are not surprised at this. What is nonsense to the rest of mankind is sense to physiologists, who have acquired such a remarkable mental constitution that things may, in their view, both be—and not be—at the same time.

Our author calmly approaches the task of analysing and explaining Pain and of showing just how much pain the lower animals suffer, or rather, how little. "What is pain?" he asks; and replies that "it may be described" as the "result" of the "excessive stimulation of a nerve" (p. 9.) After this explanation we are just as wise as we were before. But before reaching this grand conclusion, "Philanthropos" undertakes to teach us a little anatomy and physiology. Unfortunately, his manifest destiny dogs him here as elsewhere—he cannot confine himself to statements of fact, but substitutes fancies of his own. After describing the difference between the nerves along which impulses travel from distant parts of the body to the brain and spinal cord, which are called *afferent* nerves, and the nerves along which impulses flow from the brain and cord to the muscles, he presents us with this piece of information:—

> "The afferent nerves mainly begin in small organs called touch-corpuscles, great numbers of which are situated in the skin, making it much more sensitive than the deeper tissues. If you drop some hot sealing-wax on a person's hand all the little terminals of the spot on which it falls are suddenly stimulated, and there is an instant change in the activity of their molecules."

When it is stated that the terminals of the afferent nerves are distributed *all over* the economy, in an infinitely fine network, wherever a part is capable of feeling pain, internally or externally, and when it is understood that the touch-corpuscles have a *very limited distribution*, the magnitude of "Philanthropos'" blunder here will be appreciated.

> "Tactile corpuscles have been found in the following parts:—Skin of the fingers, palms and soles, back of the hands and feet, volar surface of the forearm, margins of the lips, conjunctival lining of the eyelids, and in the mucous membrane near the tip of the tongue."—Quain's Anatomy, 1882, Vol. II., p. 164.

It is only in these limited areas that the touch-bodies have been found, and yet "Philanthropos" informs us that the afferent nerves "*mainly*" begin in them. But, further. The function of these bodies, so far as is known, is not the perception of painful impressions, but the perception of those finer differences of surface and resistance which those parts of the body supplied only with ordinary nerve-endings (and yet quite as capable of feeling pain as those parts supplied with touch-organs) do not possess. This is not the only blunder of "Philanthropos" in physiology. Physiologists have a way of running a piece of wire down the spinal canal of an animal in order to destroy the spinal cord. This, in the suggestive and sympathetic phraseology of the vivisectionists, is called "pithing." "Philanthropos" informs us (p. 10) that a "pithed" frog is one "whose spinal marrow has been cut through near its junction with the brain." This we beg to remark, is not "pithing" at all.

After this hopeless blundering in elementary matters we cannot attach much weight to the scientific arguments based on them, but we may give them a moment's consideration.

In all sentient organisms there is an automatic mechanism by which many actions are performed independently, or almost independently of the will. Thus when one of our fingers is suddenly pricked, the hand is instantly jerked away; and this jerk is to a large extent involuntary. Some of these involuntary actions may be produced within a certain limited time after the death of an animal, and these are best marked in animals low down in the scale, such as frogs. In these animals, the removal of the brain even increases these involuntary responses to various irritations—"reactions" or "reflex-actions," as they are called by physiologists. But, though these actions are to a large extent automatic, *they do indicate the existence of pain or sensation in creatures whose consciousness is undestroyed.* They are the outward and visible sign of pain—its *expression.* "Philanthropos" argues that because they may be produced in creatures whose heads have been cut off, *therefore* they can *never* be taken, under any circumstances, as indications of pain. Miss Cobbe—to whose remark "Philanthropos" takes exception—was perfectly justified in speaking of "reactions" as "*Anglicè,* spasms of agony." Until a physiologist has had his nerves exposed and stimulated, and "reactions" produced under identical conditions, and found it not painful, he is not authorized to deny that, in creatures whose consciousness has not been destroyed (either for the time or permanently), reactions *are* indications of pain, and a rough measure of it. Drawing his conclusions from what happens to animals with their heads off, "Philanthropos" does not hesitate to apply them to animals with their heads on. "Motions, cries, jerks, and struggles," he says "cannot, *therefore,*"—his "therefores" are very remarkable—"be depended upon as indications of pain" (p. 8). Then, "Philanthropos," (we may ask) will you have the goodness to tell us what signs of pain you and your friends *do* depend upon in performing experiments on animals? If you have nothing to guide you—and what else can you have besides the signs you have named?—how can you ever know that your operations are *painless?* With his usual ill-fortune, "Philanthropos," who has taken all this trouble chiefly with the object of proving Dr. Ferrier's experiments on the brains of monkeys and dogs to have been painless, now finds Dr. Ferrier directly contradict him. In reply 3,228, before the Royal Commission, after explaining how he opened the skulls of the animals after putting them under chloroform, Dr. Ferrier said: "Chloroform was administered intermittently in order to allay *any movements indicative of pain* on the part of the animal." So vivisectionists differ and animals suffer!

But though "Philanthropos" has nothing by which he can know when pain is present, he can sometimes be quite certain that it is absent: "It is known," he says, "that an animal *may be* [italics the author's] unconscious while it struggles vehemently; but *there is no doubt* [italics ours] that it *is unconscious when it does not struggle at all.*" Once more we ask —and we cannot accept a negative reply—has "Philanthropos" never heard of curare? Under the influence of that drug an animal is perfectly helpless, perfectly still, and incapable of struggling, and yet, as Claude Bernard said, "may be enduring the most atrocious sufferings which the mind of man can conceive." Professor Arthur Gamgee told the Royal Commissioners (5,407) that he had proved by experiment on human subjects—children in the wards of the Children's Hospital at Manchester—that whilst power of movement was lost, sensation remained perfect in subjects under the influence of curare. Thus Gamgee and Claude

Bernard assert that a creature suffers horribly, precisely when "Philanthropos" asserts that "*there is no doubt* it is unconscious"!

"Philanthropos" argues that because men may have their skulls broken by a blow which stuns them, and thereafter lose brain-substance without suffering pain, *therefore,* dogs and monkeys may, after having a large part of their skulls removed, have their brains stimulated with electricity, hot wires, and other convenient instruments, and reactions produced without causing them any pain. We did not learn our logic in a physiological laboratory, and *therefore* are not able to follow this. But "Philanthropos" gives us a new version of the Ferrier-Yeo trial which is such a miracle of inaccuracy that it must be noticed. Let it be observed that, in his preface, he "only pleads" that he has, "at any rate, endeavoured to avoid inaccuracy." The success of his endeavour may be judged from the following:—

> "Some time ago, a case was brought into a police-court, in which a surgeon was charged with having kept monkeys in torture for months, because he had performed a series of experiments on their brains."—P. 17.

Could anything be more hopelessly muddled? The Yeo-Ferrier mistaken-identity case grows more perplexing than ever. In November, 1881, there was a trial at Bow Street. That is the one grain of fact that "Philanthropos" has not misrepresented, the rest is fancy pure and simple. In the first place it was not a *surgeon* who was charged, but a *physician*—Dr. Ferrier. The *British Medical Journal* and the *Lancet* had reported certain demonstrations of animals with mutilated brains before the International Medical Congress of 1881. In each of these reports, by different reporters—Dr. C. S. Roy and Dr. A.

Gamgee—the experiments were said to have been performed by Professor Ferrier. Professor Ferrier, at the time the experiment was performed, had no license to vivisect. Hence the summons and the trial. At the trial, one of the reporters (Dr. Roy) swore, and the other, as his counsel stated, was prepared to swear, that Dr. Ferrier did not perform the experiments, but that Professor Gerald Yeo did so. Professor Gerald Yeo *is* a *surgeon*, but he was not charged with anything. If the reports had attributed the experiments to him, no summons would have been issued, because he had a license. How anyone could be charged with keeping monkeys in torture for months "*because* he had performed a series of experiments on their brains," we must leave the vivisectionist logicians to say. No doubt this version of the case by "Philanthropos," like the reports in the journals, is "accurate enough for scientific purposes."

The following is a description of the state in which the animals in question were kept, and which does not suggest pain or suffering to "Philanthropos." We quote from the *Lancet's* report of the proceedings at the Congress, October 8, 1881 :—

> "The interest attaching to the discussion was greatly enhanced by the fact that Professor Ferrier was willing to exhibit two monkeys which he had operated upon some months previously." . . . . .
>
> "In striking contrast to the dog were two monkeys exhibited by Professor Ferrier. One of them had been operated upon in the middle of January, the left motor area having been destroyed. There had resulted from the operation right-sided hemiplegia" (paralysis of the right half of the body) "with conjugate deviation of the eyes and head" (eyes and head permanently twisted.) "Facial paralysis was at first well marked, but ceased after a fortnight. From the first there had been paralysis of the right leg, though the animal was

able to lift it up. The arm it never had been able to use. Lately, rigidity of the muscles of the paralyzed limb had been coming on. The other monkey, as a consequence of paralysis of all auditory centres, was apparently entirely unaffected by loud noises, as by the firing of percussion caps in close proximity to the head."

And "Philanthropos" sees no signs of suffering in these maimed and mutilated creatures; nothing to pity; nothing to execrate!

And why? Because "Philanthropos" has succeeded in persuading himself that animals are incapable of feeling pain to any great extent. He tells two stories to prove it. He must excuse us being a little sceptical as to the details of these stories, and altogether sceptical as to his interpretation of the animals' feelings. The first story is about a dog whose "soul was possessed by a bone," which he had kept his eye on all the time he was struggling under a painful operation. The other is about a horse who went about grazing for some hours with a dangling broken leg. From these two small incidents "Philanthropos" draws the large inference that animals never feel much pain. But, unfortunately for him, he gives his reason in the second case "No suffering," he says, "is worse than that from a broken bone" (p. 15). Few statements could well be more untrue. We know persons who have passed hours, and sometimes days, with broken bones, in moderate suffering, without finding out what had happened. We know of a youth whose leg was broken at football, and who refused to let himself be carried off the field before the game was finished. The worst suffering attending broken limbs is not to be compared with the agonies of some forms of neuralgia, of internal tumours, and of inflammations. If "Philanthropos" does not know this much, he has no right to speak on the subject of pain.

But "Philanthropos" is not dependent on his stories; he has scientific proof as well. We are quite certain that no one but a vivisectionist could have written what we shall now quote, and that neither a vivisectionist nor anyone else can make sense or English out of it.

"But the very fact that man's intellectual activity is much greater, shows that a larger surplus vitalizes his brain, and proves that the whole stock of nervous energy from which that surplus is taken must be larger than that of inferior creatures. Therefore, though an animal's nerves may display as much *irritability* as a man's, it is impossible that it can have as much *feeling* as he has, for the simple reason that it has not so much stuff to make both of." (P. 13.)

We are quite prepared by this time to hear "Philanthropos" reject the proposal to apply the Golden Rule to this question. In his article in the *Nineteenth Century* for January, 1882, Mr. Hutton proposed that we should "put ourselves in the place of the lower animals, and ask what we, with their pains, and their sensitiveness, and their prospects of life, and pain, and happiness, might fairly expect of beings of much greater power, but of common susceptibilities." In arguing as to the impracticability of this, "Philanthropos" says, "such an effort of the imagination is almost impossible." We have no doubt that it is *quite* impossible for "abstract devotees of science." There was no need for him to take up three pages to prove it. But though scientists may have lost the higher powers of the soul, it is not for the rest of mankind to discard them. We aver that, for us, the effort is not impossible; and we maintain further, that those to whom the effort is impossible are absolutely unfitted to pass a judgment on this question.—Inaccurate to the last degree; incapable of logical argument;

dead to all sympathy: the features of the British vivisector are growing on the canvas!

VIVISECTIONIST IDEAS OF CRUELTY.

Having proved to his own supreme satisfaction that animals do not feel pain keenly, and that "painful" experiments are often "painless," it was superfluous for "Philanthropos" to undertake to show that vivisection is not cruel or immoral, or degrading. If an animal undergoing pain "than which no suffering is worse" only feels it so slightly that he can quietly graze the while, how can there be such a thing as Cruelty to Animals? We should have thought it impossible; but with physiologists nothing absurd is impossible. In spite of the insensitiveness of animals it is possible according to our author to treat them with cruelty. Nay, the soul of the Dogberry of science waxes indignant at the very thought of it. "Cruelty," he exclaims, "is intolerable and cannot be tolerated!" But then what does he mean by Cruelty?

In our innocence we had supposed that "cruelty" meant the infliction of pain other than was necessary for some purpose connected with the creature itself. Pain inflicted on a creature for its own training, or otherwise for rendering it fitted for living in companionship with man, we have not been accustomed to regard as cruelty. The infliction of death may be instantaneous, and therefore painless, and is not, in our humble opinion, necessarily cruel—though the sensitive souls of the physiologists differ from us here. All pain inflicted on animals by unskilful or careless slaughterers we regard as cruelty. All pain inflicted on an animal other than for some purpose connected with the individual animal's own welfare, or beyond what is needful to insure for it a merciful death, we regard as cruelty.

"Philanthropos" takes another view. With him Cruelty does not depend on what the creature suffers, but on what the inflicter of the suffering thinks. "The infliction of pain *without justification—or with insufficient justification*—is cruelty" (p. 103). Certainly; and the justification? Is it the creature's own good? Not at all. The justification "Philanthropos" means, is the self-interest of him who inflicts the suffering. If a vivisector has a sufficiently large selfish object in view whilst he performs his experiments, no matter how extreme or prolonged the torture, there is in physiological ethics no cruelty. But how is it possible to strike a balance between the "interest" of the operator and his kindred in the one scale, and the weight of the suffering of the "subject" in the other? "Philanthropos" will show us. He strikes a balance in two ways—first, *qualitatively*, then *quantitatively*. We will take the *qualitative* balance first; the italics are his own.

"Let A. and B." he says "be two individuals of the same nature, and exactly alike." (In size, age, weight, colour and sex, we presume.)

"Ease is (as to quality) equal to pain;
Long life is superior to ease;
Activity is superior to ease;
Health is superior to ease.

"*Conclusion: Long life, mental and bodily activity and health, are benefits, which in quality, much more than balance the evil of pain.* And if A.'s pain purchases them for B., it has been fully compensated." (P. 26.)

We confess this passes our unscientific comprehension. We are unable to weigh the pain of one man, or animal, against the ease of another man, or men, or number of animals. We had thought that the *willingness* of the one whose pain purchased another's ease, had something to do with the righteousness of the transaction. We had thought that ease purchased at the cost of another's pain, when that pain was not willingly endured, was *stolen* ease. We had supposed that honourable death was better than life purchased on dishonourable terms. But thenwe are not vivisectionists.

Having thus weighed the ease of one against the pain of another, as regards *quality*, "Philanthropos" next compares the two in point of *quantity*. He invokes Sir Spencer Wells to help him in this process.

> "We know that, in order to perfect the method of performing the operation known by his name, Mr. Spencer Wells operated upon 16 (?) anæsthetised rabbits and guinea-pigs. And we know also that with his own hand he treated successfully 600 women, who would otherwise have had an exceedingly small chance of life, considering the danger of so terrible an operation, before his experiments. We know, moreover, that this number is constantly increasing, as other surgeons of sufficient skill rise up and avail themselves of his method, while no more rabbits need be killed." (P. 28.)

This is another fancy sketch by "Philanthropos." Sir Spencer Wells differs from him entirely as to the share his vivisections had in perfecting his method of operation, and the necessity of repeating the experiments. We take the latter part first. "No more rabbits need be killed" says "Philanthropos." Said Sir Spencer Wells in February last:—

> "But Mr. Treves and Mr. Meredith, *at my suggestion*, were desirous of *experimenting on some of the lower animals as to the best*

mode of uniting divided edges or surfaces of peritoneum; but the trouble and delay of the present system of licensing has hitherto restricted these operations to man and woman." Hunterian Oration. *Lancet*, February 24, 1883.

It is true, in his Statement in the *British Medical Journal* of August 27, 1881, Mr. Spencer Wells had then said his vivisections had demonstrated the point in question *once for all*. But Sir Spencer is no more exempt from the fatal incapacity for being consistent than humbler vivisectors. In this Statement just named he confesses that the improvement said to be due to vivisection was really suggested by the examination of the body of one of his patients after death, and before ever his vivisections were undertaken. He says he "*saw at once* at the post-mortem examination] *how much better it might have been if the peritoneal edges had been accurately brought together and had united.*" The vivisections taught him nothing: he saw it all before he began them. So "neither in this does their witness agree together." Further; there exists in the minds of some the false impression that the operation itself owes its existence to vivisection. And this impression "Philanthropos" tends to strengthen when he says that the 600 women would have had an exceedingly small chance of life "before his experiments." Now, Mr. Spencer Wells operated four times *before* he experimented. He says, "*The first three* women upon whom I performed ovariotomy *all recovered.* The fourth died" (*Ibid*). So the "exceedingly small chance" of "Philanthropos" was a chance of *three to one in their favour.* As for the operation being known by Sir Spencer Wells's name, that may be among the laity, but in the profession it is not so. The name of the initiator of an operation is sometimes given to the operation he is the first to perform, but Spencer

Wells was not the initiator of ovariotomy. It was performed some twenty years before he first operated.

But to return to "Philanthropos" and his syllogisms. We fear Sir Spencer Wells cannot help him in his *quantitative* argument; but he can get along very well alone. We will make a few quotations. The italics are the author's:—

"The consequence is that though we cannot always assign the precise share of vivisection in any investigation of which it has formed a part, yet we can always know that—whether it be great or small—*it is multiplied by a practically infinite factor*. . . . . We conclude, therefore, that even when we have no means of knowing the number of animals which have suffered, nor the exact degree in which men were benefited by their sufferings under experiment—*the good still exceeds the evil in quantity.*' (P. 29.)

So the *quantitative* argument is all on the side of vivisection. But a difficulty occurs which "Philanthropos"—wonderful to relate!—has noticed.

"It may be objected to this argument that by it we actually destroy all proportion between the pain inflicted and the benefit expected, and would justify the most excruciating tortures in prospect of the smallest possible addition to our knowledge."

So we should have thought: but we are told that—

"This would be true but for two reasons. First, that in practice minute fractions must always be neglected. The very condition which saves the performance of a painful experiment from being cruelty—is the presence in the operator's mind of a distinct expectation of counterbalancing good; but if this good is diffused and attenuated over infinite time, the finite mind cannot grasp it, and the condition is clearly destroyed. Secondly, the number of individuals benefited is not really infinite, but only practically so because incalculably large and quite indefinite

. . . . . These two considerations make a *reductio ad absurdum* impossible." (P. 30.)

We think our readers will agree with us that the *reductio* is quite unnecessary—it is absurd enough without any reducing. But hear his conclusion—

"The longer life, restored health and activity, of an incalculable number of men and women, extending over a considerable time for the individual, and—for the race—over the whole period of its existence, are gained by the endurance for a short time of varying degrees of annoyance, distress, and pain, by a comparatively small number of the lower animals." (Our readers will bear in mind the examples, by no means the worst, quoted above.) "There is, *therefore (!)*, *no cruelty* in the performance of such experiments. *If a physiologist makes an experiment which has no beneficial result, the act has proved in itself a cruel one*, and is to be regretted; but *he himself was not cruel* in performing it, *if he merely committed an error of judgment*, and thought that it would prove useful. On the other hand, if he has been indifferent to the pain caused, and careless whether or not he gave more than necessary—he has been cruel, and there is no defence for his conduct." (P. 104.) (The italics are ours).

We are in a maze. If animals do not suffer any pain worth mentioning, why talk of cruelty? And if there are no signs by which to judge of the amount of pain, how can a few physiologists be said to be indifferent to it? And how is it possible, under those circumstances, to weigh the presumed benefit against the pain? We can imagine the vivisectors deliberately sitting down to work out these abstract problems before commencing their experiments!

What shall we say of all this tissue of contradictions? Words are too feeble; we leave it in its nakedness to speak for itself. In the meantime *we* are convinced that animals *do* feel pain; and we ask—what about *them?* "Philanthropos" has no thought for them—all he is interested in is certain imaginary metaphysical reasonings that go on in the minds—perhaps we ought to say brains—of vivisectors, whilst they are conducting their tortures.

We, on the other hand, are concerned about the *animals*, and are quite unable to see what difference the vivisector's intentions can make in their sufferings. "Philanthropos" is, he tells us, unable to enter into the animals' feelings; what *they suffer* is not the question with him, but what the *vivisector thinks!* "There must be an *absorption in the object and process* which *withdraws the nerves (!)* from much of the *harass of sympathy*"—and therefore vivisection cannot be demoralising! (p. 32). Such is the conclusion at which "Philanthropos" arrives.

When "Philanthropos" seeks to justify vivisection by a grotesque combination of the doctrine of vicarious suffering with the Darwinian theory, we must decline to follow him. When he grows pathetic in a sentence like this:—

> "Were not our hearts bound to each other by cords which wrench one when another breaks, we should be a mass of disintegrated units, with no common life, no social unity, lower than the beasts who do feel—if not *for*, at least *with* each other," (P. 33)—

we must request him to write English if he wishes to be understood. When he further calls our attention to the Bible, and asks us to infer that, because we are there told that the Creator of all things so loves his creatures, that not a sparrow is forgotten, and that no Sabbatarian scruple is to stand in the way of a man's rendering to one of them a deed of mercy; when "Philanthropos" asks us to infer from *this* that man is justified in inflicting whatever agony he pleases on the mute creature if it be for his own selfish interest, we are reminded that it is not saints alone who can quote Scripture; and that other spirits, beside those of "Philanthropos" and Dr. Gerald Yeo (p. 98)—if indeed they be two and not one—have endeavoured by citing it to turn wrong into right.

VIVISECTION AND MEDICAL SCIENCE.

WE now come to the more purely scientific part of this book, in which the author seeks to show that vivisection has been, if not the sole, at least the chief means of bringing the science of physiology and the practice of medicine to their present perfected state. In all argumentative scientific works with pretensions to respectability, the authors do not content themselves with making statements of their own opinions or conclusions, but furnish their readers with the facts which have led them to form their opinions, or arrive at their conclusions, so that their readers may check the reasoning at every point. They do not ask that in anything they should be taken on trust. "Philanthropos," on the other hand, like some other persons of equally dubious trustworthiness, asks for an inordinate amount of confidence. We have already seen that it is not safe to put the smallest faith in his powers either of observation, or deduction, or lucid statement. When therefore he tells us that we owe the existence of "Physiological Medicine"—we hope he will take an early opportunity of explaining to the world what this great boon may be, that we may rejoice over it with our neighbours—and every considerable discovery in physiology to vivisection, we must simply decline to accept these statements of his own impressions, and pass on to those instances in which he has followed the rules of scientific argument so far as to furnish his readers with the facts from which he has drawn his deductions. But we must first say a word as to his *method* of reasoning.

Before a case can be made out for vivisection even on grounds of what has been called the "Lower Utility," that is, on grounds of its usefulness to the *physical* well-being of men—it must be shown (1) that it was an *essential* part of the process by which the discoveries claimed for it were made; and (2) that it was impossible that these discoveries could have been made by any less questionable means. These two canons of argument were clearly laid down by Mr. Lawson Tait in his famous pamphlet, of which a new edition with notes in reply to "Philanthropos" has just been issued by our Society. But "Philanthropos" cannot be brought to see the necessity of observing such rules. If the question is asked: "Could these discoveries have been made *without* vivisection?" it is sufficient for him to reply: "All that we know is—that for many centuries they were *not*." (P. 145.) On this principle it would be easy to prove almost anything. If, for example, Isaac Newton, at the moment when he saw the apple fall which suggested his great discovery, had been wearing a pair of green spectacles, "Philanthropos," if he were writing a treatise setting forth the advantages of green spectacles, would not hesitate to put forward, among the rest, that the discovery of the Law of Gravitation was due to their use. If we objected that Newton would have seen the apple fall just as well without them as with them, he would triumphantly reply: "He did *not*." It is necessary to notice this fallacy, because it accounts for many of the strange conclusions at which "Philanthropos" and his brother vivisectionists arrive. We learned our logic in a different school.

The first question we shall consider is the discovery of the Lacteals. On this point "Philanthropos" attacks us, and it must therefore be borne in mind that the word vivisection is used in *our* sense of the term, and does not include the dissection of cabbages and dead animals. In Chaper 3 of *Physiological Fallacies* we had shown, in opposition to Professor Turner's evidence before the Royal Commission, 1st, that Aselli did not discover the lacteals, but that they had been described eighteen centuries before by Alexandrian anatomists; 2nd, that the *thoracic duct*, the chief lacteal, was discovered by Eustachius in 1563; 3rd, that the vivisections of Aselli, made with the object of discovering the relations and functions of the lacteals led him hopelessly wrong; 4th, that if he had followed the legitimate method of dissecting dead animals he might have discovered that which vivisections failed to teach him; and, finally, that the true anatomy of the lacteals, was eventually discovered by Pecquet from observations on the dead subject. "Philanthropos" challenges our statements, and says that their incorrectness "cannot be better shown than by giving the exact words of Jean Pecquet, as quoted by Daremberg in his *Histoire de la Médecine*." After this we were prepared for something alsolutely crushing. Let us hear Pecquet:—

"*I had removed the heart of a dog and placed it on the table,*"

(So the animal *was* dead, after all; and the discovery *was* made on the *dead* subject and not on the living!)

"and was thinking of nothing but counting the systoles and diastoles which the last efforts of its spirits produced, when I perceived a white substance like milk flowing from the ascending vena cava into the pericardium. . . . . I opened the veins above and below the heart and I found that this substance. . . . came from the subclavian branches. . . . . I thought the mesentery might have sent this milk through channels hitherto unknown. . . . . I placed my hand on the mesentery of the animal, which was still pretty warm, and whose lacteals were not yet exhausted. I had scarcely pressed when I could see the milk flow from the two sources I had already remarked in the subclavian."*

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* This extract does not give by any means the "exact words" of Jean Pecquet; and the whole passage affords a striking example of the "scientific accuracy" of "Philanthropos." The latter gives only a general reference to Daremberg's work. This writer, in his *La Médecine, Histoire et Doctrines* (to which we suppose "Philanthropos" alludes), mentions Jean Pecquet, but gives no quotation. Until, therefore, we have the precise reference we must hold "Philanthropos" responsible for the translation. The work in which Jean Pecquet gives an account of this observation was published in 1651, in Latin, and entitled *Experimenta Nova Anatomica.* In the account there given, in Chapter II., he tells us that he saw the chyle flow from the *vena cava.* "Philanthropos" in the extract makes him say "the *ascending* vena cava." This is a flight of the scientific imagination of our author, and is, of course, pure nonsense. Another anatomical error in the extract—the statement that chyle was seen flowing from *both* subclavian branches, whereas it could only have been seen flowing from the left—is Jean Pecquet's own, and due to faulty observation. From this error, which he repeats again and again, honest dissection might have saved him. There are no words in Jean Pecquet's account corresponding to "the two sources" of the last sentence in the extract quoted. We would commend this whole passage to the careful consideration of the enthusiastic reviewer of "Philanthropos" in *Nature.*

Thus we see every step in this "discovery," from the first observation to the last, was made on the body of an animal in which life was extinct! That the animal had been previously vivisected for another purpose has nothing to do with the question. It was an accidental circumstance and not an essential condition. The same thing might have been observed in any carnivorous animal killed soon after a meal. That Pecquet afterwards performed vivisections may be true, but these added nothing to the discovery which morti-sections could not have shown equally well, or better.

It is with some little satisfaction that we note that, with the extensive acquaintance with our Anti-vivisection literature which "Philanthropos" betrays, this is the one only point wherein he finds the shadow of an opportunity for controverting our statements in matters of science. And here he supplies the materials for his own refutation.

We must now once more—we hope for the last time—approach the great question of the Circulation of the Blood. As this is one of the few occasions on which "Philanthropos" has given us his reasons, as well as his conclusions, we are bound to notice it. A little attention is needful, at starting, to the history of the subject, and we take as our authority Dr. Willis' edition of the Life and Works of Harvey, published by the Sydenham Society. Fabricius di Aquapendente (1537-1619, A.D.) under whom Harvey studied at Padua for the five years preceding 1602, perfected the anatomical knowledge of the valves of the veins, though he was not the first to notice them. But long before Harvey became acquainted with Fabricius, the passage of the blood from the right side of the heart, through the lungs to the left side, had been described more or less accurately by three philosophers. That they had mingled with the truth which they had grasped much that was fanciful, must not blind us to the fact that they *had* grasped it, any more than Harvey's fanciful notions may be allowed to detract from a due appreciation of *his* merits. When he tells us that the blood possesses powers superior to those of the elements; that it is the seat of a Soul which is not only vegetative, but also sensitive and motor; that the blood maintains and fashions all parts of the body: "proceeding at all times with such *foresight* and *understanding*, and with *definite ends* in view, as if it *employed reasoning* in its acts." (P. 507.)—when he tells us all this, we must not let the fancifulness of it cause us to deny to him the honour of having been the first to make the circulation of the blood an acknowledged fact. That the way had been well prepared for him is plain enough. In 1553, Servetus had published his work containing a graphic account of the passage of the blood from the right side of the heart to the left, through the lungs, and the change it underwent in the lungs. In 1559, Realdus Columbus had described this part of the circulation in similar words, arguing from the construction of the vessels and the position of the valves. But he had gone further, and stated that the blood was transmitted by the aorta to all parts of the body. He was, however, ignorant of the origin of the veins, believing them to rise from the liver. With the writings of Columbus Harvey was familiar, for he quotes them frequently. Then came Cesalpinus, who published works in 1569, 1583, and 1593. He was the first to use the word Circulation, which he applied to the passage of the blood round through the lungs from one side of the heart to the other. He had also an inkling of the general systemic circulation.

Harvey's work, *De Motu Cordis et Sanguinis*, was published in 1628, but was probably written ten years earlier. It will be seen that he had the views of his predecessors to guide him, and also the complete knowledge of the anatomy of the veins as furnished by his master, Fabricius. On page 41 we find him quoting Columbus to this effect:—"Why not, with Columbus, that skilful and learned anatomist, maintain and believe the like, from the capacity and structure of the pulmonary vessels; from the fact of the pulmonary veins and ventricle corresponding with them, being always found to contain blood which must needs have come from the veins and by no other passage save through the lungs?"

The question we have to consider then is this: By what means did Harvey attain a fuller conception of the circular motion of the blood? That Harvey performed vivisections we do not for one moment deny. What we wish to know is the share which these vivisections had in leading up to the formation of the idea in his mind. He shall speak for himself. We prefer to let Dr. Willis interpret his Latin—albeit "Philanthropos" is so obliging as to supply us with his own translation of the passage; a translation which unfortunately, whether accurate or otherwise, is not English. We quote from pages 45 and 46, the italics being our own:—

> "And sooth to say, when I surveyed my mass of evidence, whether derived from vivisections, and my various reflections on them, or from the ventricles of the heart, and the vessels that enter into and issue from them, the symmetry and size of these conduits,—for nature doing nothing in vain, would never have given them so large a relative size without a purpose,—or from the arrangement and intimate structure of the valves in particular, and of the other parts of the heart in general, with many things besides I frequently and seriously bethought me, and long revolved in my mind, what might

be the quantity of blood which was transmitted, in how short a time its passage might be effected, and the like; and *not finding it possible that this could be supplied by the juices of the ingested aliment, without the veins on the one hand becoming drained, and the arteries on the other getting ruptured through the excessive charge of blood, unless the blood should somehow find its way from the arteries into the veins*, and so return to the right side of the heart I began tothink whether there might not be A MOTION, AS IT WERE, IN A CIRCLE. Now this I afterwards found to be true; and I finally saw that the blood, forced by the action of the left ventricle into the arteries, was distributed to the body at large, and its several parts, *in the same manner as it is sent through the lungs*, impelled by the right ventricle into the pulmonary artery, and that it then passed through the veins, and along the vena cava, and so round to the left ventricle in the manner already indicated."

"Philanthropos" in his "translation" (p. 138) makes Harvey talk wonderful rubbish about the blood being propelled "into all parts of the body, by the pulse of the left ventricle of the heart, thence into the lungs through the arterious vein from the right; and again by the veins into the hollow vein, and thence return to the right auricle, and from the lungs by the artery called veinous to the left ventricle—as is before mentioned"!! He then exclaims, "Words can be no plainer—statements cannot be more positive—than these. If Harvey discovered the circulation of the blood at all, he discovered it by reflection upon facts supplied him by vivisection!" Here is a mighty stretch of his "green-spectacle" logic! For our part we think Dr. Lauder-Brunton is nearer the mark when he says (*Pharmacology and Therapeutics*, p. 120) "Harvey found *valves in the veins*, and *therefore* thought it probable that the blood circulated." This is sufficiently inaccurate, for, as we have seen, the valves were discovered long before Harvey's time; but it contains some truth. According to our reading of the passage, the facts which drove Harvey to the conclusion that the blood must find its way into the veins from the arteries were these:—(1.) The anatomical structure of the heart and blood-vessels; (2.) The quantity of blood contained in the body; (3.) The impossibility of the food keeping the veins full of blood if they were filled from no other source; (4.) The impossibility of the arteries bearing the strain that would be upon them if they had no outlet. Now it will be seen that not one of these points could be made good by vivisection. The common notion that Harvey *saw* the blood circulating in a living animal must be dismissed at once. That Harvey had vivisected, and that his observations from this source took their place among the rest as subjects to be considered, need not be disputed. But that these observations had any part in forming Harvey's idea, the passage above quoted conclusively disproves.

But up to the present point the discovery was only an idea: it required to be proved. And Harvey used vivisections to demonstrate the truth of it? Yes! and quite needlessly. Let us again hear himself:—

> " The internal jugular vein of a live fallow deer having been exposed, ... was divided; but a few drops of blood were observed to escape from the lower orifice rising up from under the clavicle; whilst from the superior orifice of the vein and coming down from the head, a round torrent of blood gushed forth. *You may observe the same thing any day in practising blood-letting.*" (P. 126.)

So the vivisection proved nothing that had not been proved without it before! In this way does the *habit* of experimenting on living animals lead men to perform experiments on any and every occasion, even when quite obviously needless. But after all, the crowning proof, the complete demonstration, could only be made on a *dead* subject:—

> "It may be well here to relate an experiment which I lately tried in the presence of several of my colleagues. . . . . Having tied the pulmonary artery, the pulmonary veins, and the aorta, *in the body of a man who had been hanged*, and then opened the left ventricle of the heart, we passed a tube through the vena cava into the right ventricle of the heart, and having, at the same time, attached an ox's bladder to the tube, ... we filled it nearly full of warm water, and forcibly injected the fluid into the heart, so that the greater part of a pound of water was thrown into the right auricle and ventricle. The result was, that the right auricle and ventricle were enormously distended, but not a drop of water or of blood made its escape through the orifice in the left ventricle. The ligatures having been undone, the same tube was passed into the pulmonary artery, and a tight ligature having been put round it to prevent any reflux into the right ventricle, the water in the bladder was now pushed towards the lungs, upon which a torrent of the fluid, mixed with a quantity of blood, immediately gushed forth from the perforation in the left ventricle; so that a quantity of water, equal to that which was pressed from the bladder into the lungs at each effort, instantly escaped by the perforation mentioned." (P. 597.)

By a simple variation of this experiment Harvey could have demonstrated the systemic circulation in the same way, without touching a single animal. That he was to the last ignorant of the mode of passing of the blood from the arteries to the veins appears from his saying (p. 599) that he had been led to conceive that the arteries were lost in the coats of the veins, which they entered obliquely.

That Harvey's knowledge of the nature and structure of the heart was not derived from vivisections but from dissections of dead hearts, will appear from the following:—

> "Hence all animals—and among men it is not otherwise—that are endowed with particularly strong frames, and that have large and fleshy limbs at a great distance from the heart, have this central organ of greater thickness, strength, and muscularity. And this is both obvious and necessary. Those, on the contrary, that are of softer and more slender make, have the heart more flaccid, softer, and internally either sparely or not at all fibrous. Consider farther the use of the several valves, which are all so arranged, that the blood once received into the ventricles of the heart shall never regurgitate, once forced into the pulmonary artery and aorta shall not flow back upon the ventricles." (P. 79.)

We maintain, then, that Vivisection has played no part in the discovery of the Circulation of the Blood. The fact of the circulation was at least three parts discovered through anatomical observations before Harvey's day, and the completion of the discovery could not, in any case, have been long delayed. A simple experiment on a dead body, such as that performed by Harvey himself; would have afforded conclusive demonstration without any further operation on the living or the dead. The facts which led Harvey at last to think that the blood must find its way out of the arteries into the veins, were none of them such as were supplied him by his vivisections. To sum up the matter: Harvey was a vivisector; but it was not by his vivisections that he completed, as far as he did, the discovery of the circulation of the blood.

One word more about Harvey, and we have done. It has been said that the *practice* of medicine owes him an enormous debt. In point of fact, his doctrines had no influence whatever on medical practice. It was not till two centuries after his time that wholesale blood-letting was given up; and then it was not through his teachings, or any physiological enlightenment that this great change for the better took place. Let us again hear Harvey:—

> "Now, when I maintain that the living principle resides primarily and principally in the blood, I would not have it inferred from thence that I hold all blood-letting in discredit, as dangerous and injurious. . . . For daily experience satisfies us that blood-letting has a most salutary effect in many diseases, and *is indeed the foremost among all the general remedial means.*" (P. 391.)

The only other instance in which "Philanthropos" adopts the usual method of scientific writers and gives the grounds of his conclusions, is where he contends that the operation of dividing tendons subcutaneously was first proved feasible by means of vivisection. His proof of this is extraordinary. He appeals to the catalogue of the Hunterian Museum, where are two preparations of the tendons of an ass and a deer, healed after division. There is nothing whatever in the preparations to show that these divisions had been performed by Hunter subcutaneously; and everything to make us suppose that he would have preserved the uncut skin if they had been so; but the catalogue (which has no sort of high authority) says of them "it is believed" they were divided "by subcutaneous section." This, of course, goes for nothing at all in scientific argument. But a note is appended to the catalogue notice of one of the preparations, which says that Home, in his Life of Hunter, states "that he (Hunter) *ruptured his own tendo Achillis*, which turned his attention to the *mode of union of broken tendons.*" With this object he imitated nature as accurately as he could, cutting by means of a couchingneedle the *tendo Achillis* of several dogs, killing them at various intervals to see how far the healing process had gone on. *It was not with the object of discovering an improved method of operating* at all that Hunter performed these vivisections, but *to see how nature went to work to heal a tendon when broken.* As for the operation itself, so far from vivisection having taught it to him, he *learned it from his own accident* before he began to perform the vivisections. It would seem that the latter so took up his attention that he never thought of applying to human surgery the hint his accident had given him. Here, again, we see the teaching of nature to be true; whilst illegitimate methods of research, such as vivisection, only serve to lead astray, and hinder true progress.

As "Philanthropos" gives us no authority for his statement that Medicine and Surgery have benefited so vastly by vivisection—or, at any rate, no details sufficient for us to check his reasoning—we shall not trouble ourselves about what he says on this head. One point only need be noted. He adduces the use of carbolic acid as one of the fruits of vivisection, and consequently, also, the whole system of antiseptic surgery. On this we will briefly say: (1.) That Déclat used carbolic acid before Lister. (2.) When we had the privilege of hearing Mr. Lister explain his antiseptic theory, he informed us that he elaborated it principally by means of experiments with *milk.* (3.) Mr. Lister's assistant, Mr. Watson Cheyne, has proved that the theory is all wrong, that germs can live and flourish in the most "aseptic" of wounds, and sometimes delight themselves in solutions of carbolic acid; and, further, that abscesses which have never been exposed to the air may be crowded with germs and living organisms. (Trans. Int. Med. Cong., 1881, i., 321.) (4.) Not a few lives have been lost by the indiscriminate use of carbolic acid, and much harm has often been done by it both to patient and surgeon, as was proved by the celebrated surgeon, Mr. Keith, at the International Congress. (Trans., ii., 236.)

"Philanthropos" next gives us a list of medicines, the virtues of which were all discovered, according to our author, by vivisections. Among these is *chloral.* We notice this because so much was made of it by Virchow in his celebrated address in 1881, and because it affords a good example of the danger of taking laboratory evidence as to the powers and actions of drugs. We have not yet had the details given us as to *how* the virtues of this drug became known, but this we do know, that on its first appearance it was lauded as being equal to opium as a hypnotic, and without any of its after effects *or any of its risks.* We were assured that there was no danger of chloral gaining power over those who took it so as to render them slaves of a habit. Accordingly it became the fashion; and soon its hundreds of victims proved how false the deductions from the teaching of the laboratory had been. How, indeed, *could* it be learned *there* whether or not chloral had power over the *moral* being of man? It was impossible. Chloral madness became a not unfrequent disease; and the victims whom it kept in slavery without reducing to madness were, and are, still more numerous. We have lately had a melancholy example of what this false teaching of vivisection may produce in the fate of one of the victims of chloral, a man of great eminence in two worlds of Art, who has recently passed from our midst. "Philanthropos" and Professor Virchow would have done better for their cause had they kept their boasts about chloral to themselves.

In his appendix, "Philanthropos" calls our attention to a large number of pro-vivisectionist opinions as to the necessity of vivisection on the one hand, and the fondness for animals exhibited by vivisectors on the other. This is not evidence, and we shall not notice it. When "Philanthropos" made up that string of names of those who, in reply to the question before the Commission :—"Are experiments necessary for original research?"—answered "Yes," it is a pity he forgot to add the *numbers* of those questions and replies. We have not been able to find them.

Like all British defenders of vivisection, he points with glee to the Returns furnished by Mr. Busk. We have again and again proved that these returns are not to be trusted, and will only add here one word concerning them. In his last report, Dr. Busk states, referring to the experiments we have quoted above from the *Practitioner*, and many others there recorded as bad or worse :—

> "The only operative proceeding consisting in simple inoculation with a morbid virus *by hypodermic injection*, would be *scarcely felt*. The only suffering in these cases would arise from the after consequences of the inoculation, &c., in the production of disease. . . . . The suffering, *if any*, *would be of very brief duration*, as the animal would either die or be at once killed. As a matter of fact, I have been assured *by the experimenters* that in this class *no appreciable pain was manifested.*"

When our readers recollect the *months* of suffering endured by the animals in the tubercle research which we have noticed above, and compare it with Dr. Busk's "brief" suffering, "if any," they will be able to appreciate at once his reliableness in statements of plain matters of fact, such as time, and in pronouncing an opinion on the amount of pain endured by the animals. And, again, when it is remembered that a large number of these injections, of variously horrible substances, which Dr. Busk calls *hypodermic* (*i.e.*, under the skin), were not hypodermic at all, but were made into the *eyes* of the animals, or into the abdominal cavity, it will be seen how naturally "Philanthropos" will appeal to Dr. Busk when he is in want of "facts" to suit the purposes of his arguments.

But "Philanthropos" is not *quite* happy. There *is* a danger, he says, to the physiologists. Vivisection does not—will not—cannot demoralize them; but *too much legislation* may! If we wish to preserve the moral character of the physiologists, "Philanthropos" warns us, we must *trust* them!

"*Weak honesty grows strong when leant upon; but even strong humanity, insulted and disbelieved in, may hear itself called callousness until it ceases to care for the charge.*" (P. 101.)

With this amazing sentence, whether regarded as a piece of English, or as a moral sentiment, we take leave of "Philanthropos." If vivisectionists are remarkable for their "weak honesty," we are unable to distinguish that feeble virtue from its opposite vice. We only wish we could find in the writings of vivisectionists one spark of the virtue which is commonly known by the name of honesty, for then we should have some hope of raising the question from the low levels to which they have dragged it. As for their "strong humanity," "Philanthropos" has himself told us what it is worth; and we leave our readers to distinguish if they can, between it and "callousness."

With this final word, "Philanthropos" completes his own portrait. If it is deemed desirable to multiply "philanthropists" of this kind on the earth, we cannot do better than take every opportunity of encouraging vivisection. To us it